

ABSTRACT OF THE DISCLOSURE

A sense amplifier (100) useable with memories having multi-level memory cells (105) includes a cascode device (135) coupled to the cell (105) to increase sense amplifier resolution. In a pre-charge mode, the sense amplifier (100) is configured to pre-charge a bit-line (140) of the cell (105) to reduce time required to read the cell. The pre-charge mode may include a unity gain buffer (175) to which a reference voltage is applied, and a switch (165, 170). The switch (165, 170) couples the buffer to the cascode device (135) to pre-charge the bit-line (140), and decouples the buffer from the device to enable the amplifier (100) to develop a voltage signal representing data stored in the cell. The sense amplifier (100) can be re-configured in a regeneration mode to amplify the voltage signal, to conserve chip space, and reduce cost and errors in reads.